gestive essay is his application to the peoples of this far-eastern island of terms such as "Alpine," "Adriatic," "Iberian," "Cro-Magnon," and others, which are not without objections even when applied to the population of Europe, but become doubly misleading when applied to Filipinos, who are partially hybridised with real Iberians.

G. ELLIOT SMITH.

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## PROF. GROTH'S CHEMICAL CRYSTALLOGRAPHY.

*Chemische Krystallographie.* By P. Groth. Dritter Teil, Aliphatische und hydroaromatische Kohlenstoffverbindungen. Pp. iv+804. (Leipzig: W. Engelmann, 1910.)

DESPITE the duties appertaining to a professorial chair and the unremitting labour attaching to the editorship of his flourishing *Zeitschrift für Krystallographie und Mineralogie,* Prof. von Groth proceeds steadily and rapidly to the completion of the great task he has set before him. The successive volumes have appeared at intervals of two years, and now, four years since the publication of the first, we welcome the issue of the third and penultimate volume. It includes the various aliphatic and aromatic compounds that have been obtained in crystallised form, and meets a widely and long-felt want. Putting aside a few oxalates which occur in nature, it has hitherto been impossible to turn up readily the crystal character of any of these substances; even the most comprehensive text-books on organic chemistry rarely define the forms more exactly than as being plates or needles.

The volume is composed of two parts, of which the first is by far the longer. In it the paraffins and the corresponding olefines are grouped together according to the number of carbon atoms in the molecule, the concluding chapter being devoted to the ureas and the derivatives of uric acid. In the second part the hydrobenzol derivatives and the terpenes and camphors are considered. For each substance the physical characters are stated tersely, but as completely as possible, the information including the melting point, the specific gravity, the morphological characters—the axial ratios, the indices of the observed forms, the values of the principal interfacial angles, and the directions of cleavage, if any, illustrations of crystals possessing features of exceptional interest being given—and the optical characters—the principal refractive indices for light of various standard wavelengths, the nature of the refraction, the relation of the optical indicatrix to the crystalline symmetry, and the optic axial angle; the authority for the data is recorded, and references to the original papers are given in footnotes. Each section is prefaced by a brief but interesting discussion of the substances dealt with and the relations subsisting between them. The book closes with two complete indices; in one the substances are arranged alphabetically by their names, and in the other by their formulæ in ascending order of the number of carbon atoms in the molecule. Little difficulty should therefore be experienced in tracing any particular compound. It is abundantly clear that every effort has been made to keep the book as free from errors as possible; in a work of this kind accuracy is everything.

The name of the publisher is sufficient guarantee for the excellence of the printing, which is, in fact, beyond criticism.

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## APPLICATIONS OF PHYSICAL CHEMISTRY.

(1) *Themen der physikalischen Chemie.* By Prof. E. Baur. Pp. iv+113. (Leipzig: Akademische Verlagsgesellschaft, m.b.H., 1910.) Price 4 marks.

(2) *Das chemische Gleichgewicht auf Grand mechanischer Vorstellungen.* By Prof. H. v. Jüptner. Pp. v+367. (Leipzig and Berlin: B. G. Teubner, 1910.) Price 11 marks.

THE two volumes here noticed are not text-books of physical chemistry in the ordinary sense. They deal with selected parts of the subject, and are distinguished by the prominence given to its technical application.

Prof. Baur's book contains the substance of a series of vacation lectures delivered in the Brunswick Polytechnicum at the instance of the Society of German Engineers. The lectures are models of clear exposition, and are invariably terse and to the point. The experimental illustrations, directions for the repetition of which are included in the text, are well chosen, and calculated to stimulate inquiry. After a preliminary lecture on the principles of modern physical chemistry, the author proceeds to discuss such varied matters as voltaic cells, the blast-furnace, Deacon's process, the contact process for sulphuric acid, the production of atmospheric nitrate, catalysis, gas explosions, explosives in general, metallography, and colloidal chemistry. Students, both of industrial and of pure chemistry will find much to interest them in the little volume.

Prof. von Jüptner's work on chemical equilibrium is based on the following conceptions. The maximum external work which a chemical process is capable of performing is a measure of the chemical affinity of the process. This work can be measured by the gas pressures of the substances concerned. Hence chemical processes may be treated as mechanical, one substance being pumped into another (production of a compound) or being pumped out of another (decomposition of a compound). Thus dissociation phenomena may be considered as being at the root of all chemical processes. If the dissociation-pressure curves of all compounds are known, the behaviour of the compounds when they are brought together may be predicted; those with greater dissociation pressures will be decomposed, those with smaller dissociation pressures will be formed. The process will come to an end when the partial dissociation pressures of the common product (*e.g.* oxygen pressures of oxides) become equal.

Proceeding on these principles, the author considers the equilibrium conditions in systems with solid, liquid, and gaseous phases. As the book is intended in the first instance for practical men engaged in chemical industry, it is characterised by a wealth of

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numerical data for dissociation pressures. The equations employed are often only approximate, but though subject to future correction, they cannot fail to be useful. In the study of iron and steel the author has achieved special eminence, so that the last chapter, which is devoted to the application of the above principles to the chemical reactions occurring in the blast furnace will be read with peculiar interest.

## *OUR BOOK SHELF.*

*The World of Dreams.* By Havelock Ellis. Pp. xii+288. (London: Constable and Co., Ltd., 1911.) 7*s*. 6*d*. net.

MR. ELLIS very truly remarks that in the past the literature of dreaming has often been vitiated by bad observation and reckless theory. In the volume under review he gives a large number of carefully recorded dreams—chiefly his own—and is sparing of hypothesis. The drift of the book may be indicated as follows:—

The sleeping consciousness is weak in apperception and in will. It is, in fact, partly dissociated, as in insanity. But it can *reason;* and dreams are its serious and careful attempts to construct an adequate theory of the phenomena. These latter psychical facts may be sensations derived from external stimuli such as sounds—as when the drip of water from a burst pipe upon the floor near a dog's bed caused his owner to dream that the dog was being crushed in a mangle—or from visceral disturbances, as when indigestion causes dreams of terrifying situations. Stimuli of any kind are magnified by the sleeping consciousness, and the theory (the dream) is consequently out of proportion to their real importance, as when the singing of a canary caused a dream of the performance of Haydn's "Creation." Fear-dreams are often exaggerations of dimly-realised bodily discomfort, as when a lady had a horrible dream of murder after a supper of pheasant. The interesting point about this is that the dream is the result, and not the cause, of the emotion. Unpleasant feelings are really experienced, and the dream-consciousness invents a theory to account for them. This is in line with the James-Lange theory of emotion in general.

As to ultimate psychical origins, Mr. Ellis thinks that Freud presses his sexual-wish theory too far. The great Vienna psychologist has done brilliant work, but has become obsessed by his pet formula. His key will not fit all the locks. Probably most psychologists will now agree with Mr. Ellis on this point.

The chapter on dreams of flying and falling is particularly good. It can scarcely be doubted that the absence of pressure against the soles of the feet—a vague mass of sensation always present when standing or sitting—must have a great deal to do with these dreams. The other sensory nerves over the body being relaxed and inactive, the bed ceases to be felt; and the consequence is a dream of floating unsupported in the air. This suggests an explanation of the subjective feeling of levitation in the case of many saints. In ecstasy there is considerable anæsthesia, both of the soles of the feet and elsewhere.

The book is popular in style, but is thoroughly scientific in method, and Mr. Ellis has a wide acquaintance with the work of other investigators in this field. His contribution is a welcome one.

*The Economy of Food: a Popular Treatise on Nutrition, Food, and Diet.* By J. Alan Murray. Pp. xii+253. (London: Constable and Co., Ltd., 1911.) 3*s*. 6*d*. net.

THE subtitle of Mr. Alan Murray's book and the following extract from the preface will indicate its scope:—"The book is intended for students of domestic economy, cooks, caterers, housekeepers, and managers of institutions rather than for specialists in physiology, chemistry, and hygiene. The subject cannot be treated adequately without reference to the principles of these sciences; but the more difficult parts have been relegated to footnotes, and the use of technical terms in the text have been avoided as far as possible. The first section deals with the requirements of the body. The origin, properties, and composition of the commoner kinds of food are discussed in the second. In the third an attempt is made to combine these two branches in a form suitable for everyday use—to translate protein, carbohydrates, &c., into terms of bread and meat, *i.e.* of breakfast, dinner, and supper."

Mr. Murray has been very successful in his attempt; the scientific portions are accurate and up-to-date, the practical parts will fill a long-felt want, and the whole is presented in a clear and readable manner. In these days when so much rubbish is printed for popular consumption in the daily Press and elsewhere on the subject of food and diet, it is a godsend to have a really trustworthy and popular guide which it is a real pleasure to be able to recommend. Food, of all other subjects, is one which lends itself to the exploitation of fads. There is nothing of the sort in the present volume; we have no advocacy of any particular system, no hysterics on the subject of the Chittenden diet, or sour milk, or standard bread, but just plain, simple, sober, common sense. W. D. H.

*A Text-Book of Botany.* By J. M. Lowson. Seventh impression (fifth edition), revised and enlarged. Pp. viii+607. (London: W. B. Clive, University Tutorial Press, Ltd.; Cambridge: University Tutorial Press, 1910.) Price 6*s*. 6*d*.

ALTHOUGH there have been numerous and material alterations of the subject-matter for this edition, there is no change in the general arrangement, and the book still maintains its very apparent examination character—that is to say, the dominating idea is not to stimulate the observational and thinking faculties but to provide in the space as much information as possible, duly punctuated and diagrammatised. The general arrangement is not unsatisfactory, but it is not apparent why there should be such an early insertion of a chapter and various sections dealing with histology; also it may be suggested that the heading of chapter iv. would nowadays be more applicable to the chapter on ecology. The latter is a new introduction and requires revision, as the exposition is disjointed, and there is no mention of that important unit of classification, the formation. For the most part, however, the presentment of the information is essentially explicit and well ordered, and the trend of recent investigation and modern theories is carefully indicated. A useful series of physiological experiments is outlined, and the importance of combining practical work with reading is emphasised. The selection of cryptogamic types and the general scope of the book follow the requirements of the intermediate examinations at London University.

*Le Chaos et l'Harmonie universelle.* By Félix le Dantec. Pp. 195. (Paris: Félix Alcan, 1911.) Price 2.50 francs.

To a long list of previously published works, M. le Dantec has added a book dealing with a variety of subjects treated sometimes from a philosophical point of view, and at others from the mathematical side. To give the titles of a few of the sections is to indicate the range of the treatise. "Heredity and education," "the definition of chance," "living bodies," and "life" may be mentioned.

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